**3GPP TSG- WG3 Meeting #**

**Xiamen, China, 9 - 13 October, 2023 (Revision of C3-233137)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **0691** | **rev** | **3** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | |
| ***Title:*** | Supporting query parameters extensibility | | | | | | | | |
|  |  | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Huawei, Intel, AT&T, Interdigital, China Mobile, China Telecom, Samsung, China Unicom, SIA, Verizon, ZTE, Ericsson | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | |
|  |  | | | | | | | | |
| ***Work item code:*** | NBI18 | | | | |  | ***Date:*** | | 2023-09-29 |
|  |  | | | |  | |  | |  |
| ***Category:*** | **B** | |  | | | | ***Release:*** | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | |
| ***Reason for change:*** | | Implementions may want to use vendor-specific query parameters to filter responses (i.e. for HTTP GET based operations) based on the values of existing standardized fields of the targeted resource representation for which no standardized query parameters were defined or on vendor-specific fields provided within vendor-specific extensions to the targeted resource representation.  In particular, there is a request from ETSI ISG MEC (cf. LSs in C3-231446 and C3-232026) to support the above for the CAPIF\_Discover\_Service\_API. | | | | | | | |
|  | |  | | | | | | | |
| ***Summary of change:*** | | This CR proposes to:   * Define a scheme for enabling the provisioning of vendor-specific query parameters. | | | | | | | |
|  | |  | | | | | | | |
| ***Consequences if not approved:*** | | * Vendor-specific query parameters cannot be supported. * ETSI ISG MEC requirements cannot be fulfilled. | | | | | | | |
|  | | |  | | | | | | |
| ***Clauses affected:*** | | | 2, 5.2.13 | | | | | | |
|  | | |  | | | | | | |
|  | | | **Y** | **N** |  | | |  | |
| ***Other specs*** | | |  | **X** | Other core specifications | | | TS/TR ... CR ... | |
| ***affected:*** | | |  | **X** | Test specifications | | | TS/TR ... CR ... | |
| ***(show related CRs)*** | | |  | **X** | O&M Specifications | | | TS/TR ... CR ... | |
|  | | |  | | | | | | |
| ***Other comments:*** | | | This CR does not impact the OpenAPI descriptions defined in this specification. | | | | | | |
|  | | |  | | | | | | |
| ***This CR's revision history:*** | | |  | | | | | | |

\* \* \* \* Start of changes \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[3] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[4] Void.

[5] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[6] Hypertext Transfer Protocol (HTTP) Status Code Registry at IANA, <http://www.iana.org/assignments/http-status-codes>.

[7] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[8] IETF RFC 7807: "Problem Details for HTTP APIs".

[9] 3GPP TS 29.154: "Service capability exposure functionality over Nt reference point".

[10] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[11] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".

[12] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications".

[13] 3GPP TS 29.201: "Representational State Transfer (REST) reference point between Application Function (AF) and Protocol Converter (PC)".

[14] 3GPP TS 23.003: "Numbering, addressing and identification".

[15] IETF RFC 3339: "Date and Time on the Internet: Timestamps".

[16] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[17] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[18] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

[19] IETF RFC 7233: "Hypertext Transfer Protocol (HTTP/1.1): Range Requests".

[20] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

[21] IETF RFC 7235: "Hypertext Transfer Protocol (HTTP/1.1): Authentication".

[22] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[23] 3GPP TS 29.155: "Traffic steering control; Representational state transfer (REST) over St reference point".

[24] 3GPP TS 29.368: "Tsp interface protocol between the MTC Interworking Function (MTC-IWF) and Service Capability Server (SCS)".

[25] 3GPP TS 29.337: "Diameter-based T4 interface for communications with packet data networks and applications".

[26] 3GPP TS 29.250: "Nu reference point between SCEF and PFDF for sponsored data connectivity".

[27] Open API: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[28] IETF RFC 1166: "Internet Numbers".

[29] IETF RFC 5952: "A recommendation for Ipv6 address text representation".

[30] 3GPP TS 29.153: "Service capability exposure functionality over Ns reference point".

[31] 3GPP TS 24.250: "Protocol for Reliable Data Service; Stage 3".

[32] IETF RFC 6455: "The Websocket Protocol".

[33] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[34] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs)".

[35] 3GPP TS 33.187: "Security aspects of Machine-Type Communications (MTC) and other mobile data applications communications enhancements".

[36] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE);MB2 Reference Point;Stage 3".

[37] 3GPP TS 29.116: "Presentational state transfer over xMB reference point between Content Provider and BM-SC".

[38] IETF RFC 5789: "PATCH method for HTTP".

[39] IETF RFC 7396: "JSON Merge Patch".

[40] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[41] YAML (10/2009): "YAML Ain't Markup Language (YAML™) Version 1.2", <http://www.yaml.org/spec/1.2/spec.html>.

[42] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[43] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[44] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[45] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[46] IETF RFC 6733: "Diameter Base Protocol".

[47] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".

[48] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".

[49] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[50] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[51] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[52] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[53] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

[54] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[55] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE); stage 2".

[56] 3GPP TS 26.348, "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[57] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[58] 3GPP TR 21.900: "Technical Specification Group working methods".

[59] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC); Protocol Specification".

[60] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[61] 3GPP TS 29.675: "User Equipment (UE) radio capability provisioning service; Stage 3".

[62] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[63] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[64] 3GPP TS 24.526: "User Equipment (UE) policies for 5G System (5GS); Stage 3".

[65] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[66] IETF RFC 5322: "Internet Message Format".

[67] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[68] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[69] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF".

[70] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[71] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

\* \* \* \* Next changes \* \* \* \*

## 5.2.13 Vendor-specific extensions

### 5.2.13.1 General

The vendor specific extensions specified in the below clauses are mechanisms for the APIs to re-use. The applicability of these mechanisms for specific 3GPP Northbound and application layer APIs is specified in the respective API specifications.

### 5.2.13.2 Vendor-specific extensions to the data model

Vendor-specific extensions for information elements may be generally supported in the 3GPP northbound and application layer APIs by reusing the same vendor-specific extentions mechanism defined for 5GC APIs in clause 6.6.3 of 3GPP TS 29.500 [44] with the IANA-assigned enterprise code as the vendor-specific member name.

In the 3GPP northbound and application layer APIs, the vendor may alternatively be identified by setting the placeholder "nnnnn" in the vendor-specific member name to a domain name registered to the vendor, or a URN from the URN space managed by the vendor, with central repository managed global unique vendor-specific member name to avoid clashing names between vendors.

An example for the IANA-assigned enterprise code to identify the vendor is:

EXAMPLE 1: The vendor-specific member name for vendor "3GPP" based on IANA enterprise number would be:

"vendorSpecific-010415": {

...

}

Examples for the additional alternatives to identify the vendor are:

EXAMPLE 2: The vendor-specific member name for vendor "3GPP" based on domain name would be:

"vendorSpecific-3gpp.org": {

  ...

}

EXAMPLE 3: The vendor-specific member name for vendor "3GPP" based on URN would be:

"vendorSpecific-urn:3gpp:example": {

  ...

}

NOTE: The preferred naming scheme (for the "nnnnn" placeholder) for vendor-specific member names is the one based on the IANA-assigned enterprise code defined in clause 6.6.3 of 3GPP TS 29.500 [44].

### 5.2.13.3 Vendor-specific query parameters

Vendor-specific extensions to the query component of an HTTP request may be supported in the 3GPP northbound and application layer APIs by allowing the provisioning of vendor-specific query parameters in order to support additional vendor-specific filtering criteria. Whether an operation (e.g. using the HTTP GET method) on a specific resource of a 3GPP northbound or application layer API shall support the processing of vendor-specific query parameters shall be explicitly specified (within the corresponding resource or custom operation definition clauses) in the definition of this API operation in the technical specification where it is defined. This pattern applies to querying resources of "collection" or "store" archetype.

A vendor-specific query parameter shall be encoded as follows:

- The query parameter name shall start with "vend-spec" followed by the actual name of the query parameter, i.e. "vend-spec-<query parameter name>".

- The query parameter value shall be encoded as a JSON object containing two attributes as defined in Table 5.2.13.2-1, wherein:

- the "target" attribute is a JSON pointer (as per RFC 6901 [70]) towards the targeted attribute in the targeted resource representation; and

- the "value" attribute contains the actual value of the query parameter that is to be used for filtering and shall hence be encoded in the same way as the attribute in the resource representation that it targets.

Table 5.2.13.2-1: Vendor-specific query parameter value content definition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| target | String | M | 1 | Contains the JSON pointer (as per RFC 6901 [70]) to the attribute in the resource representation that the provided vendor-specific query parameter is targeting. |  |
| value | <Any simple or structured data structure> | O | 0..1 | Contains the vendor-specific query parameter value. |  |

EXAMPLE 1: Assuming that vendor-specific query parameters are supported for the MonitoringEvent API, if an authorized service consumer wants to retrieve the representations of the "Individual Monitoring Event Subscription" resources that contain a specific value (e.g. 6) for the "maximumNumberOfReports" attribute, then it can send a GET request using the following vendor-specific query parameter:

GET {apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions?**vend-spec-max-reports={"target": "/maximumNumberOfReports", value: "6"}**

EXAMPLE 2: Assuming that vendor-specific query parameters are supported for the MonitoringEvent API, if within the representations of the “Individual Monitoring Event Subscription” resources, a vendor-specific extension to the data model is provided by an AF via the "vendorSpecific-010415" attribute as specified in clause 5.2.13.1 and contains additional/alternative target location accuracy values within the "addAccuracy" attribute, and an authorized service consumer wants to retrieve the representations of those "Individual Monitoring Event Subscription" resources that contain a specific value for the "addAccuracy" attribute, then it can send a GET request using the following vendor-specific query parameter:

GET {apiRoot}/3gpp-monitoring-event/v1/{scsAsId}/subscriptions?**vend-spec-accuracy={"target": "/vendorSpecific-010415/addAccuracy", value: "CELL\_OR\_TA"}**

\* \* \* \* End of changes \* \* \* \*